

Historical and Current Distribution of Smooth-coated otter (*Lutrogale perspicillata sindica*) in Sindh, Pakistan

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Abstract: The study was conducted from October 2008 to September 2010 to record the historical and current distribution of smooth-coated otter (*Lutrogale perspicillata sindica*) in Sindh province of Pakistan. Surveys were conducted jointly by professional staff from Sindh Wildlife Department and WWF-Pakistan. An extensive literature review was carried out to explore the historic distribution of the species in Sindh. For recording the current distribution, different direct and indirect methods including direct observation, observing tracks, holts, spraints and feeding remains were applied. Local people were interviewed using a pre-tested questionnaire. Around 5000 km were traversed covering 36 different sites in 12 districts of Sindh and the existence of smooth-coated otter was confirmed at 25 sites in 11 districts. Both the historical and current distribution of the species was plotted on maps using GIS tools. The results showed that the species existed in isolated populations and in fragmented habitats in its type locality where it was once distributed evenly and all along the Indus River and irrigation system.

Key words: Sindh otter, Indus River, Sukkur barrage, Indus eco-region, Pakistan Wildlife Foundation.

INTRODUCTION

Two otter species exist in Pakistan: the smooth-coated otter (*Lutrogale perspicillata*) and the Eurasian otter (*Lutra lutra*). The Eurasian otter occurs in the northern mountainous region while the smooth-coated otter occurs in Khyber Pakhtunkhwa, Punjab and Sindh Provinces of Pakistan (Roberts 1997; Khan *et al.* 2009). Reports of hunters also show the existence of the smooth-coated otter in Balochistan province (pers. comm.; Mr. Faiz Mohammad, a local conservationist). The sub-species found along the Indus river has been referred as the "Sindh otter" (*Lutrogale perspicillata sindica*) by Pocock (1940).

The wildlife conservation movement started in Pakistan during the early 1970s following the release of a report on the World Wildlife Fund (WWF) expedition to Pakistan (1967) and based on that a report of the Wildlife Enquiry Committee (1971) under the Ministry of Agriculture and Works, Government of Pakistan (Khan and Bhaagat, 2010). But since then only a few practical efforts have been made by wildlife biologists and ecologists to study or update the existing knowledge about mammals especially otters in the country. According to the Wildlife Enquiry Committee Report (1971), the smooth-coated otter was categorized as "Endangered" in the country. In 1997, Roberts described 188 mammalian species and

provided their conservation status in Pakistan, which listed the smooth-coated otter as being "Rare". However, according to a more recent assessment (Sheikh and Molur, 2005) the species has been assessed as "Near Threatened" in Pakistan. The species is also protected under Provincial Wildlife Legislation being included in the 3rd Schedule which means it cannot be hunted under any circumstances except for the scientific studies. Even in the presence of such wildlife laws, the species has been hunted ruthlessly because of lax enforcement of legislation and the demand for its fur. This has resulted in a considerable decrease in its population. In addition, habitat degradation, water pollution, human-otter conflicts, misconceptions of its use in medicinal recipes and above all the lack of awareness about the importance and ecological role of the species have also contributed to its decline and put the species at risk (Khan *et al.* 2009).

The smooth-coated otter is widely distributed in South and South East Asia, including Pakistan, India, Nepal, Bhutan, Bangladesh, South West China, Myanmar, Thailand, Vietnam, Malaysia, Sumatra, Java and Borneo (Mason and Macdonald, 1986; Corbet and Hill 1992).

Isolated populations of the species also exist in Iraq (Pocock, 1941). Hooshang *et al.* (1997) and Mirzaei *et al.* (2010) have reported the species to be extinct in Iran; present only in the Hawr-al-Azim wetland, Khuzestan, located near the borders with Iraq. Blanford (1888)

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reported that the species was prominent in the Indus valley in Sindh. Murray (1884) observed 20-30 tamed otters tethered by fishermen on the River Indus, while some were basking or playing on the sand. Pocock (1939) described the species to be extant in Pakistan extending from Bahawalpur southwards to Sindh; in the lower Indus valley and Eastern Nara swamp. Sindh otter has been regarded as a distinct race being different from the Indian form, having a smaller size (Pocock, 1939).

The present study was designed to document both historical as well as current distribution of the species in Sindh Province. The study was conducted jointly by Sindh Wildlife Department (SWD), Government of Sindh and WWF Pakistan, Islamabad (WWF-P) from October 2008 to September 2010.

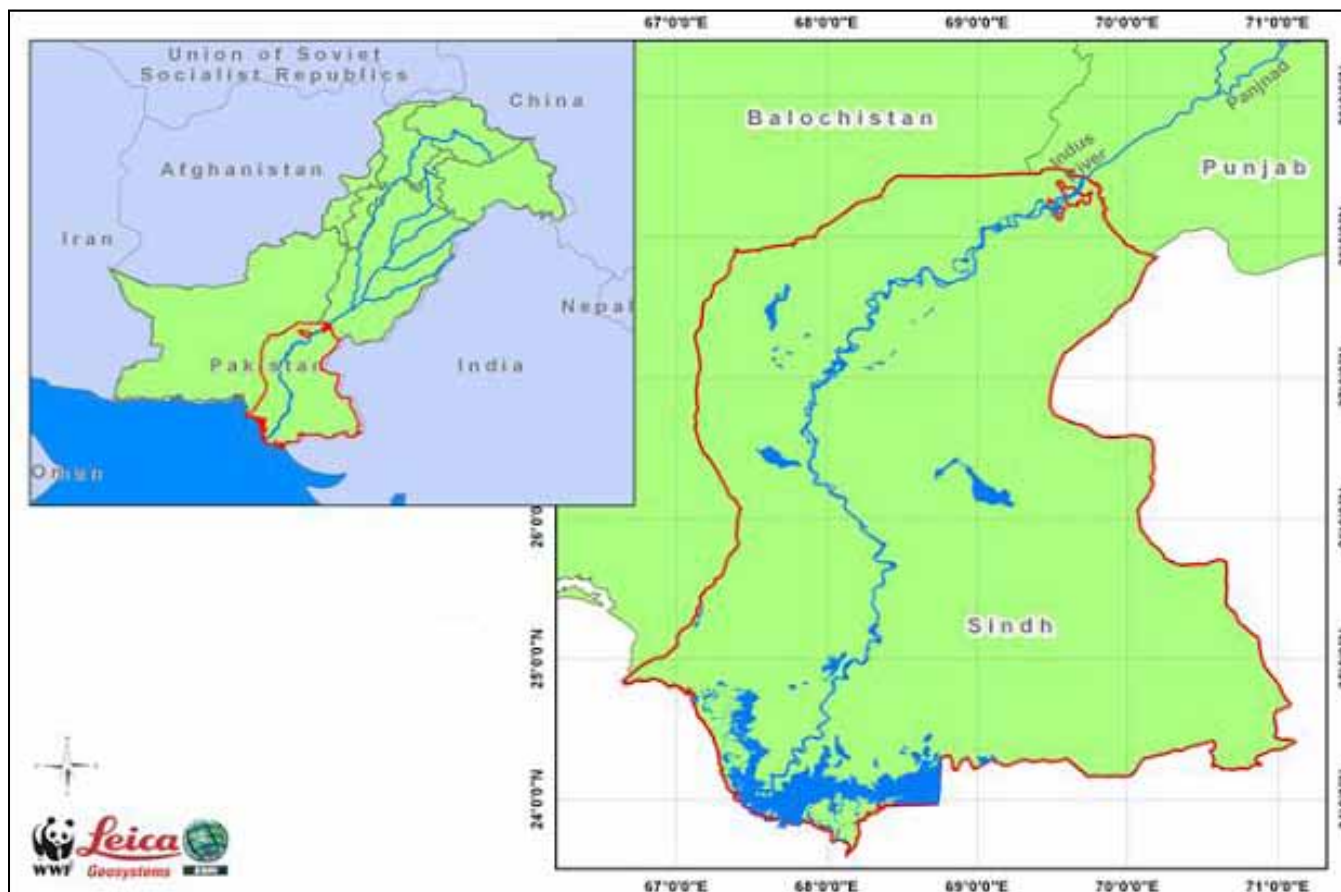


Fig. 1: Map of the study area; Sindh Province of Pakistan

Pakistan came into being in 1947 and since then only a few workers have dealt with the otters. Ellerman and Scot (1951), Ellerman (1961) and Prater (1965) confirmed the occurrence of this species in Pakistan. Siddiqui (1969), Ahmad and Ghalib (1975) and Roberts (1997) have also described Smooth-coated otters in their published material while discussing the mammalian fauna of Sindh province. Roberts (1997) reported the species to occur in the areas of Keti Bunder, Sindh coast, Sundari Lake and in the East Nara swamps, about 25 km upstream of Sukkur Barrage. He considered its distribution range beyond the lower Indus as indefinite. Gachal and Slater (2004) and Gachal *et al.* (2007) reported the distribution of the species from Sukkur to Guddu Barrage. Khan and Husnain (2008) reported the species around Keti Shah riverine forest in Sukkur district.

MATERIALS AND METHODS

Study Area

Sindh province of Pakistan includes 23 districts and is located in South Eastern part of Pakistan between 23° and 28° N latitudes and 66° and 71° E longitudes covering an area of 140,914 km² (about 18% of the country's total land area, Government of Pakistan 1998). It is bordered to the North West by Balochistan Province, to the North East by Punjab Province, to the Southern side by the Arabian Sea and towards the East by Rajasthan and Gujrat states of India (Fig. 1)

The study area represents four geophysical parts with Khirthar mountain range on its West, a central

plain bifurcated by the Indus river, a desert belt to the East and the Indus delta to the South. The Indus River is regarded as the lifeline and backbone of the economy for the Province as it provides the irrigation and drinking water to the Province (Akbar, 2008). The network of canals, in Sindh, off take from three barrages viz., Guddu, Sukkur and Kotri on the Indus River. A large number of freshwater lakes and ponds of varying sizes are formed due to seepage of water along different canals and annual inundation of river water during monsoon that provide suitable habitats for smooth-coated otter (Khan *et al.* 2009). Four types of distinct ecosystems exist in the study area *i.e.*, tropical thorn forests, riverine wetlands, deserts and coastal ecosystems (Akbar, 2008).

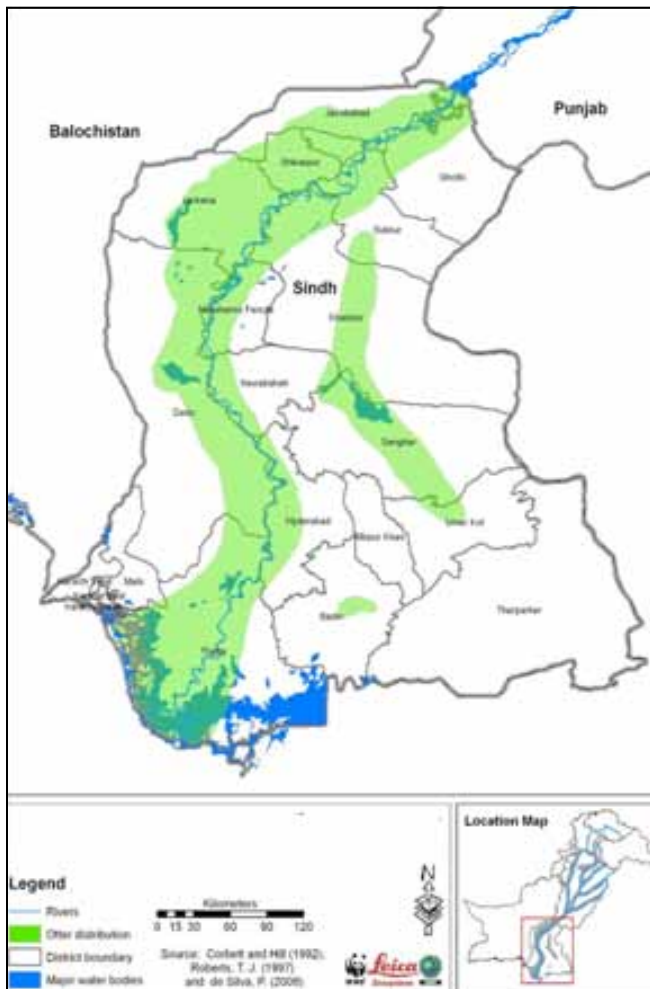


Fig. 2: Historical distribution of Smooth coated otter in Sindh, Pakistan

METHODOLOGY

Historical Distribution

An extensive literature review was carried out to explore the historic distribution of smooth-coated otter in Sindh. Apart from gathering secondary information from published and unpublished papers and reports,

relevant people in different areas, including the officials of Wildlife, Fisheries, Forest and Irrigation departments, Fisher Folk Forum, local hunters, fishermen, fish farmers, fish traders, boatmen and some political and influential people were contacted to obtain information about the historical distribution of otters in Sindh.

Current Distribution

The study area represents different types of habitat and terrain comprising semi-desert plains, cultivated lands, wild lands, rivers, barrages, canals, lakes, ponds and fish farms. Therefore, different direct and indirect methods were applied to find out the evidence of otter occurrence. Fish markets in different districts, where the fishermen gather daily to sell their catch, were also visited to listen to different fishermen and fish traders and to have some information about the existence of the otter. A questionnaire was developed (Appendix 1) in order to interview different people and obtain information about the otter's historic and current distribution.

Based on the information obtained through all the sources, 36 sites in 12 districts entailing potential otter habitats were identified, marked on the map and visited to confirm the existence of otters. Recent otter tracks, holts, spraints and feeding remains were the means to confirm such existence. GPS co-ordinates were recorded using GPS receiver Garmin Map 76 at each of the sites where otter existence was confirmed. The geographical co-ordinates along with the localities and habitat information were entered into MS Excel for further processing. These geographic points helped in delineating the areas of the species presence. Most of the sighting locations were in the geographical co-ordinates of Degrees Minutes Seconds (DMS) format which were converted into Degrees Decimals (DD) using MS Excel. The geo-coded sighting point datasets were retrieved in the Arc-View GIS as event theme for displaying species existence to map its distribution.

RESULTS

Historical Distribution of Smooth-Coated Otter in Sindh (Before Ahmad, 1998)

Based on the available literature and personal communication with local communities and some biologists, the historical distribution of smooth-coated otter in Sindh Province was recorded and plotted on a map (Fig. 3). Smooth coated otter was reported along the Eastern Nara by Wroughton (1916), along the River Indus throughout the Sindh Province (Jerdon 1874; Sterndale 1884; Murray 1884; Blanford 1888; Mountfort and Poore 1968) and in upper Sindh, lower Indus valley and Eastern Nara including Sukkur and Eastern Khairpur (Pocock 1939 and 1941). Harris (1968) described its

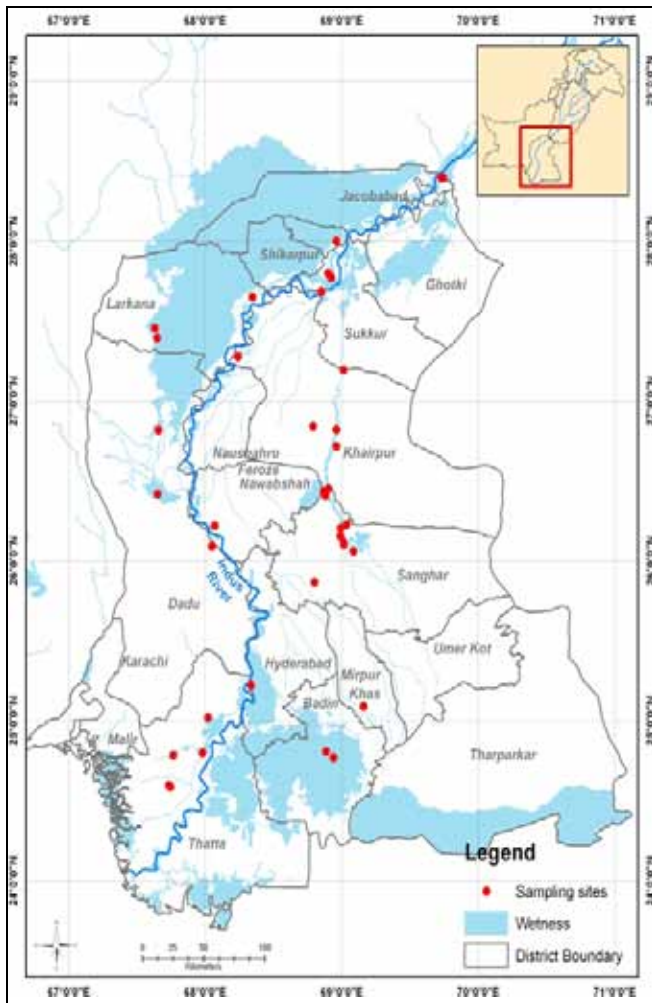


Fig. 3: Sampling sites in the study area

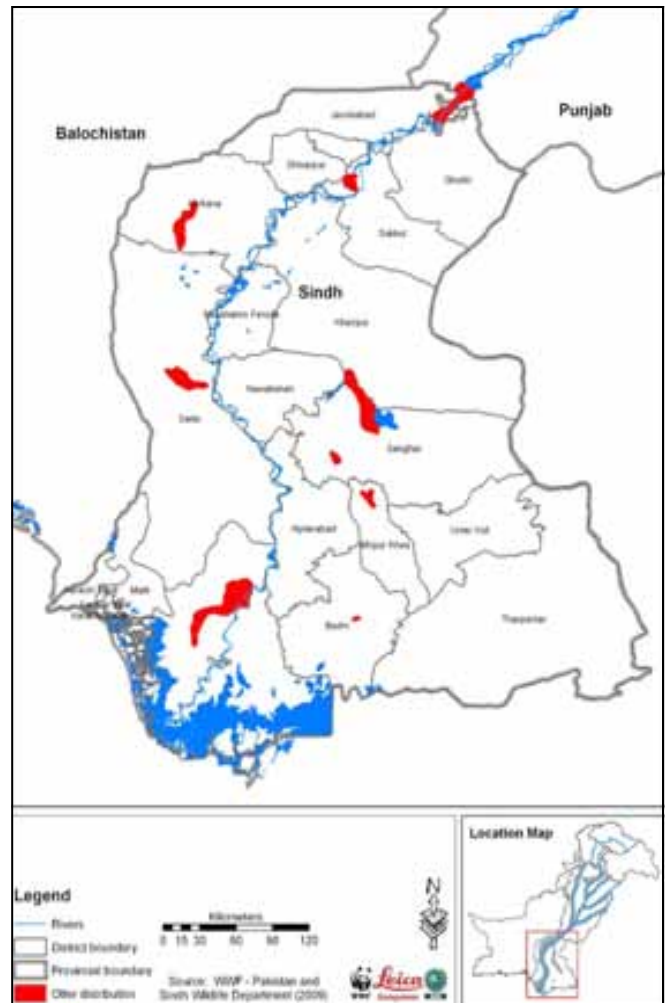


Fig. 4: Current distribution of Smooth coated otter in Sindh, Pakistan

range in Chak in Sukkur district of Sindh, the Indus valley from Bahawalpur southwards to Sindh, Eastern Nara and Khairpur. Roberts (1977 and 1997) reported the existence of the species at Keti Bunder, Sindh coast, Sundari Lake and East Nara swamps and described its range beyond the lower Indus. Its distribution range in Sindh was along Nara canal, Keenjhar and Haleji lakes, around Sukkur barrage and coastal area of Keti Bunder in Thatta District especially at the time of high and low tides (Ahmad 1998).

Current Distribution of Smooth-Coated Otter in Sindh (After Ahmad, 1998)

About 5,000 km distance was traversed in 12 out of 23 districts of Sindh province visiting 36 sites (Fig. 3) to record the existence of otter. At 25 sites (Table 1) in 11 districts the presence of otter was confirmed. Five out of 25 sites (Site No. 8, 10, 13, 15, 17) were considered potential otter sites where the species could be found throughout the year while the 20 sites of positive otter existence were visited by otters occasionally in different seasons.

Observation Records

At six different sites (Site No. 3, 8, 13, 15, 17, 24) the otter was observed directly; the existence of otter at the 20 sites was confirmed on the basis of indirect evidences like holts, tracks, spraints, feeding remains and interviews with different people including fishermen, fish farmers, hunters etc. (Table 2).

Table 1: Twenty five sites where otter existence was confirmed in Sindh

Sr. No.	Site	District	GPS Coordinates	Habitat Description
1	Guddu Barrage;	Kashmore-Kandhkot	N 28° 23' .796" E 69° 44' .574"	Thick vegetation of <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> and other plants that provide food, refuge and vast home range to otters.
2	Summanu Lake with adjoining ponds	Ghotki	N 28° 23' .748" E 69° 43' .869"	Vegetation includes <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> and <i>Phragmites carca</i> . Small islands thickly vegetated with <i>Typha sp.</i> and <i>Phragmites sp.</i> in the lake offer shelter and refuge and plenty of fish in the lake make the site a good otter habitat.
3	Maachhko, Tehsil Ubaro	Ghotki	N 28° 17' 52.6" E 69° 42' 18.7"	Natural and artificially constructed fish farms which local communities use to grow and harvest the fish annually. Vast area with wild as well as useful agricultural lands in-between fish farms with vegetation like <i>Saccharum sp.</i> , <i>Phragmites sp.</i> , <i>Prosopis juliflora</i> etc. provide shelter and cover to otters.
4	Keti Shah Riverine Forest	Sukkur	N 27° 48' .068" E 68° 54' .054"	River banks with <i>Tamarix indica</i> , <i>Saccharum spontaneum</i> , <i>Phragmites carca</i> and other vegetation are a secure and distant place with no human activities.
5	Keti Shah Riverine Forest	Sukkur	N 27° 46' .785" E 68° 55' .183"	River banks with <i>Tamarix indica</i> , <i>Saccharum spontaneum</i> , <i>Phragmites carca</i> and other vegetation are a secure and distant place with no human activities.
6	Hummal Lake	Qambar-Shahdadkot	N 27° 41' .159" E 68° 51' .166"	Sparse <i>Typha</i> growth in patches on small islands in the lake and wild lands around the lake offer shelter and refuge while plenty of fish in the lake makes it a good habitat.
7	Hummal Lake	Qambar-Shahdadkot	N 26° 49' .267" E 67° 39' .388"	Sparse <i>Typha</i> growth in patches on small islands in the lake and wild lands around the lake offer shelter and refuge while plenty of fish in the lake makes it a good habitat.
8	Upper Nara Canal	Khairpur	N 26° 27' .097" E 68° 54' .113"	Canal banks are thickly vegetated: Trees like <i>Prosopis juliflora</i> , <i>Dalbergia sissoo</i> and <i>Acacia nilotica</i> , shrubs like <i>Calotropis procera</i> , <i>Saccharum spontaneum</i> and <i>Phragmites carca</i> : small ponds along both the banks have thick vegetation of <i>Typha</i> and <i>Saccharum spontaneum</i> . Beyond the ponds along both the banks, there are agricultural fields hence some human activities.
9	Jamrao Headwork	Nawab Shah	N 26° 56' .005" E 68° 58' .327"	Thick vegetation of <i>Prosopis juliflora</i> , <i>Saccharum spontaneum</i> and <i>Typha domingensis</i> along canal banks and along seepage water ponds with agricultural lands on both sides of the canal beyond the seepage water ponds.
10	Baqaar Lake	Sanghar	N 26° 50' .744" E 68° 47' .399"	Sand dunes along one side while <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> , <i>Prosopis juliflora</i> and other vegetation along the other sides of the lake.
11	Dhalor Mori	Sanghar	N 25° 05' .570" E 69° 09' .531"	Fish farms surrounded by thick vegetation of <i>Typha sp.</i> and <i>Saccharum sp.</i> and a canal with its seepage water lagoons having plenty of fish that attract otters.
12	Khipro Canal	Sanghar	N 26° 06' .103" E 69° 00' .926"	Canal banks covered by thick vegetation of <i>Typh sp.</i> and <i>Saccharum sp.</i> with agricultural lands all around.
13	Lower Nara Canal	Sanghar	N 26° 07' .049" E 69° 00' .790"	Canal banks thickly vegetated with <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> , <i>Prosopis juliflora</i> and other shrubs with mostly sandy soil. Many small and large sized and inter-connected seepage water ponds along both the banks surrounded by <i>Typha sp.</i> and <i>Phragmites sp.</i>
14	Goath Leghari	Sanghar	N 26° 09' .275" E 68° 59' .470"	Mostly agricultural fields but inter-connected seepage water ponds surrounded by <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> and <i>Phragmites carca</i> also exist.

15	Chotiari Dam	Sanghar	N 26° 12' .313" E 68° 59' .571"	A number of small and large sized islands within the dam vegetated with trees like <i>Tamarix indica</i> , <i>Acacia nilotica</i> , <i>Dalbergia sissoo</i> , <i>Eucalyptus camaldulensis</i> and others and shrubs like <i>Calotropis procera</i> , <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> , and <i>Prosopis juliflora</i> . A few hamlets with livestock and a number of fishermen with their fishing boats remain active throughout the year.
16	Usman Ibopoto	Sanghar	N 26° 13' .617" E 69° 02' .206"	Agricultural fields with a number of inter-connected seepage water ponds surrounded by <i>Typha sp.</i> and <i>Saccharum sp.</i> near Chotiari dam.
17	Seepage water near Power House	Sanghar	N 26° 24' .412" E 68° 52' .766"	Small inter-connected seepage water ponds surrounded mainly by <i>Typha sp.</i> , <i>Saccharum sp.</i> , and <i>Phragmites sp.</i> Most of the area represents agricultural fields with patches of waterlogged lands in-between.
18	Manchhar Lake	Jamshoro	N 26° 25' .097" E 67° 39' .113"	Sparse <i>Typha</i> growth in patches on small islands in the lake and hundreds of floating houses of fishermen.
19	Talaar village	Badin	N 24° 46' .244" E 68° 56' .414"	Agricultural fields but also some wild lands with a number of freshwater ponds having <i>Saccharum sp.</i> and <i>Typha sp.</i>
20	Mirpur Sakro	Thatta	N 24° 35' .349" E 67° 44' .668"	Agricultural fields with a large freshwater lake having thickly vegetated <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> and <i>Phragmites carca</i> .
21	Mirpur Sakro	Thatta	N 24° 35' .855" E 67° 44' .023"	Agricultural fields with some seepage water ponds along a canal surrounded by <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> , <i>Phragmites carca</i> and other vegetation.
22	Haleji Lake	Thatta	N 24° 47' .212" E 67° 45' .947"	Small islands inside the lake thickly vegetated with <i>Typha</i> and small but interconnected ponds along western side of the lake surrounded with <i>Prosopis juliflora</i> , <i>Phragmites carca</i> and <i>Saccharum spontaneum</i> .
23	KDA branch canal	Thatta	N 24° 48' .017" E 67° 58' .860"	Canal banks covered by thick vegetation of <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> with a number of freshwater ponds along the banks
24	Keenjhar Lake	Thatta	N 25° 01' .254" E 68° 01' .215"	Thick vegetation <i>Typha sp.</i> , <i>Prosopis juliflora</i> <i>Saccharum sp.</i> etc. around the lake. A tourist spot where thousands of visitors come on weekends.
25	Jamrao canal	Mirpur Khas	N 25° 35' 33.8" E 69° 04' 40.4"	Canal banks covered by <i>Typha domingensis</i> , <i>Saccharum spontaneum</i> and <i>Prosopis juliflora</i> . Seepage water ponds beyond the banks and some water logged areas with sparsely vegetated <i>Prosopis juliflora</i> .

Table 2: Observation records of otter in the study area, Sindh

S r. No.	Location / Observation Site	Direct Observation / Sighting	Indirect Observations				
			Holts	Tracks and Trails	Sprints	Feeding Remains	Interviews with locals
1	Guddu Barrage	-	-	-	✓	-	✓
2	Summanu Lake	-	-	✓	✓	✓	✓
3	Maachhko; Ubaro	✓	-	✓	-	-	✓
4	Keti Shah Forest	-	-	✓	-	-	✓
5	Keti Shah Forest	-	-	✓	-	-	✓
6	Hummal Lake	-	-	-	-	-	✓
7	Hummal Lake	-	-	-	-	-	✓

8	Upper Nara Canal	✓	-	✓	✓	✓	✓
9	Jamrao Headwork	-	✓	✓	-	-	✓
10	Baqaar Lake	-	-	✓	-	-	✓
11	Dhalor Mori	-	-	✓	-	-	✓
12	Khipro Canal	-	-	-	-	-	✓
13	Lower Nara Canal	✓	-	✓	✓	-	✓
14	Goath Leghari	-	-	✓	-	-	✓
15	Chotiari Dam	✓	✓	✓	✓	✓	✓
16	Usman Ibopoto	-	-	✓	-	-	✓
17	Seepage water	✓	-	✓	✓	✓	✓
18	Manchhar Lake	-	-	-	-	-	✓
19	Talaar village	-	-	✓	-	-	✓
20	Mirpur Sakro	-	-	✓	-	-	✓
21	Mirpur Sakro	-	-	✓	-	-	✓
22	Haleji Lake	-	-	✓	-	-	✓
23	KDA branch canal	-	-	✓	-	-	✓
24	Keenjhar Lake	✓	-	✓	-	-	✓
25	Jamrau canal	-	-	✓	-	-	✓

DISCUSSION

A review of historical records and literature and personal communications with different biologists in the country revealed that the smooth-coated otter was found throughout the Sindh Province especially along the River Indus (Jerdon, 1874; Sterndale, 1884; Murray, 1884; Blanford 1888; Pocock 1939 and 1941; Harris, 1968; Roberts, 1977 and 1997 and Ahmad, 1998). After traversing around 5,000 km in 12 out of 23 districts of Sindh and visiting 36 sites (Fig. 3), the existence of the smooth-coated otter was confirmed at 25 sites in 11 districts (Fig. 4). The current study suggests that the otter population is facing a decline in the study area. The species, which was once distributed evenly and all along the Indus River and irrigation system in Sindh (Roberts, 1997), is now restricted in isolated populations and in fragmented habitats. Reasons for the decline of the Sindh otter in its type locality are poor economic conditions of local communities, unemployment, habitat fragmentation, otter fishermen conflicts and lack of awareness about otters. High demand for otter skins in international markets (IOSF, 2008) and its high price in the study area and low risk for the hunters due to weak enforcement of wildlife laws have encouraged the poor local communities to carry out otter hunting (Khan and Hasnain, 2008). Some of the man-made disturbances and inhibiting factors for otters like habitat destruction through vegetation removal, water pollution and planned

annual forest fires, over hunting, lack of awareness and continuous and regular human intrusions in otter habitats have compelled smooth-coated otters to live in scattered populations in fragmented habitats and roam around continuously in search of adequate habitats for their survival in the study area where once it existed in vast areas almost all along the Indus river.

Despite all this, some of the local fishermen consider the presence of the otter a blessing as they get more fish trapped in their nets due to otter activity. Fishermen that used to keep otters as pets to assist in fishing in the past confided that the otter was a very intelligent and loyal animal and can be tamed in a short period of time.

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APPENDIX 1

QUESTIONNAIRE

Investigating Otter's Existence in Sindh, Pakistan

Interview Date:

1. Name

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2. Age

Day:	Month:	Year:
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3. Education

Nil:	Primary:	Middle:	Matric:	Higher:
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4. Occupation

Fisherman:	Fish Farmer:	Agriculturist:	Other:
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5. Resident of

Village:	Tehsil:	District:
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6. Contact No.

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7. Have you ever seen an otter?

Yes:	No.
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8. If you have seen an otter, When?

A week ago:	A month ago:	A year ago:	Other:
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9. How it looked like?

Like a dog:	Like a cat:	something else:
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10. Which color it had?

Black:	Yellow:	Brown:	Other:
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11. Can you tell us about its size?

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12. Where did you see the animal?

In water:	Near water:	Away from water:	On land:
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13. At which time did you see the animal?

Morning:	noon:	after noon:	evening:	night:
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14. What the animal was doing when you saw him?

Feeding:	Resting:	Walking:	Playing:	Grooming:
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15. What was animal's behavior when he realized that he is being watched?

Ran away:	Stand still & Looking at you:	Other:
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16. What was the group size?

Single animal:	A pair:	Other:
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17. Can you show us any evidence of otter like tracks, holts, spraints, feeding remains?

Yes:	No.
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18. Have you ever caught an otter?

Yes:	No.
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19. Have you ever kept an otter as a pet?

Yes:	No.
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20. Do you know someone who has kept or used to keep otters as pets?

Yes:	No.
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21. Can you tell us about otter's behavior in captivity?

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22. Do you know what do the otters eat?

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23. Do you know about the preferred fish species of otters?

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24. Why do the people hunt otters?

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25. Have you ever seen an otter attacking the humans?

Yes:	No.
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26. Do you know someone who kills otters for their pelts?

Yes:	No.
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27. Do you know someone who deals in otter skins/pelts?

Yes:	No.
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28. Otter damages fish stocks in fish farms, should otters be killed?

Yes:	No.
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29. Do you know about the importance/ecological role of otter?

Yes:	No.
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30. Can you tell us about otter's population trend in your area?

Increasing:	Decreasing:	Stable:	Don't know:
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31. Should we save otters or not?

Yes:	No.
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32. How the otters can be conserved in your area?

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33. How can we control otter hunting?

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34. How can we convince otter hunters for saving otters?

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35. Any other information/story/remarks about otters

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